WE CLAIM:

1. A method of monitoring optical performance of a Dense Wave Division Multiplex (DWDM) optical communication system in which a plurality of channels are multiplexed within an optical fiber, the method comprising steps of:

   receiving an optical signal transported through a respective one of the channels, the optical signal being a modulated by a predetermined spreading code;

   detecting a modulation power of the predetermined spreading code; and

   estimating an optical power of the optical signal using the detected modulation power of the predetermined spreading code.

2. A method as claimed in claim 1, wherein the predetermined spreading code is unique across all of the channels multiplexed within the fiber.

3. A method as claimed in claim 2, wherein the predetermined spreading code comprises a spectrally white bit sequence having a predetermined chip duration.

4. A method as claimed in claim 3, wherein the step of receiving the optical signal comprises a step of:

   introducing a predetermined time delay to the optical signal.

5. A method as claimed in claim 4, wherein the predetermined time delay is unique across all of the channels multiplexed within the fiber.

6. A method as claimed in claim 5, wherein the predetermined time delay is a function of wavelength of the optical signal.

7. A method as claimed in claim 5, wherein a difference between the respective predetermined time delays of any two channels is equivalent to at least one spreading code chip duration.

8. A method as claimed in claim 1, wherein the step of detecting a modulation power of the predetermined spreading code comprises steps of:

converting an aggregate light beam composed of optical signals within all of the channels of the fiber, into a corresponding electrical signal;

decomposing the electrical signal into the predetermined spreading code of the optical signal; and

measuring an amplitude of the decomposed electrical signal.

9. A method as claimed in claim 8, wherein the step of decomposing the electrical signal comprises a step of multiplying the electrical signal by the predetermined spreading code.

10. A method as claimed in claim 1, wherein the optical signal is received as a data signal at a downstream

end of the optical fiber, and the estimated optical power of the optical signal is indicative of gain/attenuation experienced by the optical signal within the fiber.

11. A method as claimed in claim 1, wherein the optical signal is received as a reflected signal at an upstream end of the optical fiber, and the estimated optical power of the optical signal is indicative of a reflection of the optical signal in an upstream direction of the fiber.

12. A method as claimed in claim 11, further comprising a step of estimating a distance to a point of reflection.

13. A method as claimed in claim 12, wherein the step of estimating the distance comprises steps of:

converting a reflected light beam within the fiber into a corresponding electrical signal;

multiplying the electrical signal by a plurality of copies of the spreading code, each copy having a respective different time delay;

auto-correlating each multiplication result to identify the time delay that most closely matches a time delay of the spreading code in the reflected light beam; and

estimating a distance to the point of reflection based on the identified time delay.

14. An optical performance monitor adapted for monitoring optical performance of a Dense Wave Division

Multiplex (DWDM) optical communication system in which a plurality of channels are multiplexed within an optical fiber, the monitor comprising:

receiving means for receiving an optical signal transported through a respective one of the channels, the optical signal being modulated by a predetermined spreading code;

detecting means for detecting a modulation power of the predetermined spreading code; and

estimating means for estimating an optical power of the optical signal using the detected modulation power of the predetermined spreading code.

15. An optical performance monitor as claimed in claim 14, wherein:

the receiving means is adapted to introduce a predetermined time delay to the optical signal.

16. An optical performance monitor as claimed in claim 15, wherein the predetermined time delay is unique across all of the channels multiplexed within the fiber.

17. An optical performance monitor as claimed in claim 16, wherein the predetermined time delay is a function of wavelength of the optical signal.

18. An optical performance monitor as claimed in claim 17, wherein a difference between the respective predetermined time delays of any two channels is equivalent to at least one spreading code chip duration.

19. An optical performance monitor as claimed in claim 14, wherein the detecting means is adapted to:

convert an aggregate light beam composed of optical signals within all of the channels of the fiber, into a corresponding electrical signal;

decompose the electrical signal into the predetermined spreading code of the optical signal; and

measure an amplitude of the decomposed electrical signal.

20. An optical performance monitor as claimed in claim 19, wherein the detecting means is adapted to decompose the electrical signal by multiplying the electrical signal by the predetermined spreading code.

21. An optical performance monitor as claimed in claim 14, wherein:

the receiving means is adapted to receive the optical signal as a data signal at a downstream end of the optical fiber; and

the estimating means is adapted to estimate gain/attenuation experienced by the optical signal within the fiber from the optical power of the optical signal.

22. An optical performance monitor as claimed in claim 14, wherein:

the receiving means is adapted to receive the optical signal as a reflected signal at an upstream end of the optical fiber; and

the estimating means is adapted to estimate the reflection of the optical signal in an upstream direction of the fiber, from the optical power of the optical.

23. An optical performance monitor as claimed in claim 22, wherein the estimating means is further adapted to estimate a distance to a point of reflection.

24. An optical performance monitor as claimed in claim 23, wherein:

the receiving means is further adapted to convert a reflected light beam within the fiber into a corresponding electrical signal;

the detecting means is further adapted to multiply the electrical signal by a plurality of copies of the spreading code, each copy having a respective different time delay; and

the estimating means is further adapted to:

auto-correlate each multiplication result to identify the time delay that most closely matches a time delay of the spreading code in the reflected light beam; and

estimate a distance to the point of reflection based on the identified time delay.